

2. *Bathynectes longipes* (Risso).

1816. *Portunus longipes*, Risso, Crust. de Nice, p. 30, pl. i. fig. 5.
 1828. *Portunus longipes*, Roux, Crust. de la Médit. pl. iv. figs. 1, 2.
 1829. *Portunus infractus*, Otto, Nov. Act. Phys.-Med. Acad. C. L.-C. Nat. Cur. vol. xiv. p. 331, pl. xx. fig. 1.
 1851. *Portunus Dalyelli*, Spence Bate, Ann. & Mag. Nat. Hist. vol. vii. p. 320, pl. vi. fig. 9.
 1853. *Portunus longipes*, Bell, Brit. Stalk-eyed Crust. p. 361.
 1885. *Bathynectes longipes*, Carus, Prod. Faunæ Medit. p. 518.

Frontal margin slightly four-lobed or merely waved, waves four (representing the usual lobes), outer lobes or waves the wider. First four antero-lateral teeth almost as in *B. superba*, fifth not more than half as long again as the fourth. Transverse ridge of carapace as in the typical species. Chelipeds having the meros unarmed; carpus simply scabrous and only distally produced on the inner margin into a strongly developed triangular process, terminating acutely, but this process unarmed with lateral teeth; hand having one distal tooth at the extremity of the inner margin, but otherwise unarmed.

British Localities. Polperro, Cornwall; and Falmouth (*Mus. Norm.*); Oxwich Bay, near Swansea (*Bate*); Banff (? *T. Edward*, included in list of Crustacea at the end of his 'Life'; but that list has many errors).

Distribution. Naples, Zool. Stat. (*Mus. Norm.*), Nice (*Targioni-Tozzetti*), Genoa (*Verany*), Sicily (*Vienna Museum*), Adriatic (*Grube, Heller, &c.*), Black Sea (*Rathke*).

XXIX.—*Lepton squamosum* (*Montagu*), a *Commensal*. By the Rev. Canon A. M. NORMAN, M.A., D.C.L., F.R.S., &c.

LEPTON SQUAMOSUM has always been regarded as a rare shell. Although single valves are frequently dredged on various parts of our coasts few cabinets can boast of a series of perfect specimens.

In 1858 I procured a fine series of perfect though dead specimens among heaps of Nullipore and sand which had been dredged for manure and were lying on the shore at Glengarriff, in Bantry Bay. I had never, however, seen it alive until I went to Salcombe, Devonshire, in 1875, for the special purpose of looking for certain Invertebrata which Montagu had procured there. There I found *Lepton squa-*

mosum, and the circumstances under which it occurred were remarkable. I was digging on the eastern side of the harbour in the hope of finding *Callianassa subterranea*, the parasite of which, *Ione thoracica*, I was especially anxious to procure. I did not succeed in finding the *Callianassa*, but came across large numbers of the long passages formed by *Gebia stellata*, the mouths of which passages opened into the sides of little pools in the muddy sand at about half-tide. In every case where the burrow was still occupied by the living *Gebia* I found in the burrow and at a short distance from the mouth one, or in some cases two, living *Lepton squamosum*. The burrows of the *Gebia* are lined with an ochreous-coloured slimy deposit, and upon this it seems probable that the *Lepton* feeds. Here, then, would seem to be a case of commensalism. These observations of course require verification, and I trust any naturalists who have the opportunity of examining the homes of *Gebia* will search within them for the *Lepton*. It is worth remarking that the geographical range of the crustacean and of the mollusk are, as far as is known, the same; both occur in the Mediterranean, for the *Gebia litoralis* of Risso is synonymous with *G. stellata*, Montagu, and both reach Scandinavia, in which country the *Lepton* has long been known and recently the crustacean also has been found.

The only malacologists who have observed the animal of *Lepton* in Britain are Alder and Clark, the first of whom procured his specimen at Salcombe and the latter near Exmouth, where, from the nature of the shore, we may pretty safely predicate that *Gebia* also lives.

A striking confirmation of the view here put forward of the commensalism of *Lepton squamosum* is to be found in a passage in Jeffreys's 'British Conchology,' vol. ii. p. 194. He writes:—"A species (*Lepton loripes*), half an inch long, found on the coast of Florida has a singular habitat. According to Mr. Stimpson, the discoverer, 'it lives in sand or mud, on the flats, near low-water mark, at the depth of a foot below the surface, and generally occupies the holes of marine worms and fossorial crustacea.' This might warrant a supposition that the animal of *Lepton* is predaceous." To this remarkable confirmation of the habits of the species observed by me at Salcombe I may add that the very same genera of fossorial crustacea which live at the latter place are those which occur also on the Floridan coast, where they are represented by *Callianassa major*, Say, and *Gebia affinis*, Say.

Of course I cannot acquiesce in Dr. Jeffreys's concluding supposition that "the animal of *Lepton* is predaceous," if, indeed, by that expression he meant that it would attack the

crustacean. Imagine a little and most tender bivalve like this attacking a *Gebia*! with what organ might it be supposed to enter on the contest? But the surprising thing is the opposite to this. Why does not the crustacean make a meal of the mollusk? Its abstention in this matter can only be accounted for by the supposition that there exists, as in so many other cases among animals, an hereditary friendship which induces the stronger to be amicably disposed towards the weaker, and to allow it to take up its lodging in the winding passages of its own house. The presence of *Lepton* is, I take it, clearly no case of parasitism, as that of *Montacuta substriata* (Montagu) on the test of *Spatangus purpureus*, or of the genus *Stylifer* on *Echini* and other Echinodermata, in which cases the parasite would seem to feed upon the exudations of the body direct from the body itself; still less does it find its counterpart in *Modiolaria marmorata*, Forbes, imbedded in the tunic of Ascidians. It appears to me to be perhaps paralleled in the case of a "greenish gelatinous annelid," which, according to Mr. D. Robertson's observations, is almost invariably associated with *Lima hians* in the marvellously woven Nullipore nest of that mollusk; and it would seem that the annelid lives in the Lima's nest, and the *Lepton* in the *Gebia*'s burrow with similar objects, namely to feed on the secretions from the body of the owner of the house, with which the walls of the dwelling are charged, and that the owners return kindness for the work of the little scavengers who keep their houses clean. Before I knew anything of all this I had often wondered at the extraordinary compression of the shell of *Lepton squamosum*. Now it is evident, taking into consideration the habits of the animal, the great advantage of such a shell. It lies perfectly flat on the floor of the passage, presenting no obtruding portion; and thus, as Mr. *Gebia* scuttles in and out of his dwelling, which he does at a great rate, there is no fear of the *Lepton* being swept, intentionally or unintentionally, by feet or tail from its position. Moreover, however friendly disposed Mr. *Gebia* may be to his guest, and even if it had the sense and wish if the guest were extruded to take it up in its chelipeds and replace it—after the manner of *Pagurus Prideauxii*'s dealings with its bosom friend *Adamsia palliata*—the shell is so delicate that the attempt to replace it would almost assuredly result in its destruction. It is most necessary therefore that the chances of removal should be reduced to a minimum. Hence an admirable adaptation of means to an end.